REMARKS

Reconsideration and allowance of the present application are respectfully requested. Claims 1-3, 11-13, and 15-30 are currently pending in this application.

Regarding the 35 U.S.C. § 112, Second Paragraph, Rejection

Claims 25 is rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. Claim 25 has been amended in this Response in a manner which is believed to satisfactorily address the antecedent basis issue identified by the Office Action. Accordingly, the Applicant respectfully requests that the § 112 rejection be withdrawn.

Regarding the 35 U.S.C. § 103 Rejections

Claims 1-9, 11-22, and 25-27 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Published Application No. 20040054689A1 to Salmonsen et al. (referred to below as "Salmonsen") in view of U.S. Patent No. 6,208,350 to Herrera (referred to below as "Herrera"). Applicant respectfully traverses this rejection for the following reasons.

Prior to addressing the rejection, it is believed that the Patent Office may benefit from a brief review of exemplary aspects of the invention disclosed in the specification. Of course, the detailed description in the specification does not limit the claims. Nevertheless, an understanding of certain salient features of the invention will help the Patent Office better appreciate the distinction between the claims (to be discussed below) and the applied references.

According to one exemplary implementation, the specification describes functionality for performing multiple video processing tasks in a single operation, as opposed to serially. For instance, methods, apparatuses, and computer readable media are described for de-interlacing a principal video stream at the same time that at least one video sub-stream is combined with the principal video stream. See page 4, lines 5-9 of the specification. More specifically, the invention executes these two functions such that they can be performed in a single memory read/write operation, rather than in multiple passes. That is, whereas the system 200 shown in Fig. 2 requires at least two stages to perform the de-interlacing and the compositing operations (requiring at least two reads from memory), the system 300 shown in Fig. 3 requires only a single stage (e.g., a single memory read/write transaction) (requiring, in one exemplary case, only a single read from memory). See page 11, lines 17-23 of the specification. Performing these tasks in a single transaction, as opposed to staggered serial transactions, reduces the bandwidth requirements of the processing operation. See page 4, lines 10-12 of the specification. For example, in one case, the technique described in the specification can achieve approximately a 62% bandwidth saving compared to the case in which video processing operations are performed as separate operations in series. See page 13, lines 14 and 15 of the specification. One way of implementing the above-identified features is by providing a graphics unit which receives input from texturing units, substantially in parallel, associated with the principal video stream and the video sub-stream. See page 4, lines 14-17.

The primary reference, Salmonsen, describes an emulator interface that can analyze content communications to determine supported content formats, determine the format of presented content, and reformat or transcode the content to place the presented content in the supported format (paragraph 0007). The video processing associated

within this emulation can involve: removing an arbitrary frame region for processing; de-interlacing a video frame; enlarging or reducing video width or height; filtering for image resizing; removing an arbitrary frame region for encoding; downsampling of video width/height; video frame flipping or mirror imaging; gamma correcting; anti-aliasing; and color manipulating (note, for example, the list enumerated in claim 18 of Salmonsen).

The secondary reference, Herrera, discloses a video processing stage 14 (depicted in Fig. 1) that includes three sub-stages. The following excerpt of Herrera describes the third substage 21 (column 3, lines 14-26, with emphasis added):

> The resulting YUV 4:2:2 and decoded sub-picture digital video signals are then provided to the third sub-stage 21 of video processing stage 14 which the YUV 4:2:2 and decoded sub-picture digital video signals are blended together in an alpha blend process 32 to produce a translucent overlay, as described above and in detail in the DVD specification. *Next*, the blended digital video signal is provided to a YUV-to-RGB conversion process 34, in which the blended digital video signal is converted from a YUV format into a corresponding red-green-blue (RGB) format. The resulting RGB digital video signal is *then* provided to an image scaling process 36, in which the RGB digital video signal is scaled to a particular size for display.

Herrera describes an improvement where three operations performed in the video processing stage 14 are allocated to a graphics unit: a motion compensation process 28; a YUV 4:2:0-to-3:2:2 conversion process 30; and an alpha blending process 32. See column 9, lines 49-60. These three operations are performed in series, as indicated, for example, by the fact that Herrera identifies the blending process as the "final stage" (column 16, line 66).

Neither Salmonsen nor Herrera, whether considered alone or in combination, disclose the subject matter of the claims. For example, consider independent claim 1, reproduced below in its entirety (with emphasis added):

> 1. A method for processing video data, comprising:
>
> receiving a principal video stream from a source;
>
> receiving a video sub-stream containing supplemental information associated with the principal video stream;
>
> *in a single stage operation*, performing *an operation on the principal video stream and combining the principal video stream with the video sub-stream* to produce processed data, *wherein the single stage operation requires only a single read transaction to perform the single stage operation*; and
>
> outputting the processed data.

As identified above, Salmonsen identifies a list of video processing operations including: removing an arbitrary frame region for processing; de-interlacing a video frame; enlarging or reducing video width or height; filtering for image resizing; removing an arbitrary frame region for encoding; downsampling of video width/height; video frame flipping or mirror imaging; gamma correcting; anti-aliasing; and color manipulating. Further, Salmonsen states that an emulator 800 can "generate a plurality of subpictures that overlay video for captions, sub-titles, karaoke, menus, and animation" (paragraph 0137). However, nowhere does Salmonsen disclose at least the element of claim 1 which reads: "*in a single stage operation*, performing *an operation on the principal video stream and combining the principal video stream with the video sub-stream* to produce processed data, *wherein the single stage operation requires only a single read*

transaction to perform the single stage operation." For instance, there is absolutely no hint in Salmonsen that the generating of subpictures (described in paragraph No. 0137) takes place in a single stage along with any other processing performed on a principal video stream.

Recognizing the shortcomings of Salmonsen, the Office Action supplements the rejection with Herrera. But Herrera fares no better in meeting the subject matter recited in claim 1. For example, Herrera discloses a stage 14 that include a third substage 21. Substage 21, in turn, includes alpha-blending 32, YUV-to-RGB conversion 34, and image scaling 36. But the terms "stage" and "substage" in Herrera are not being used in the same sense that "stage" is used in claim 1. To clarify this issue, claim 1 has been amended to recite: *wherein the single stage operation requires only a single read transaction to perform the single stage operation*. There is no indication in either Salmonsen and Herrera that any video operations are coupled together in a single stage that involves a single read transaction as claimed.

For example, as noted above, Herrera describes the operations in the stage 14 as being performed in series, as indicated, for example, by Herrera's use of the word "next," "then," "final," etc. In a conventional video processing pipeline, the output of a first operation serves as input to a second operation, and the output of the second operation serves as input to a third operation, and so forth. Each input operation along the pipeline conventionally requires a separate read transaction, where input data is retrieved from memory and supplied to the processing unit which will perform the computations, followed by a write transaction where the output results are written to memory. Hence, by virtue of the fact that Herrera discloses a collection of operations performed in series, it requires multiple read transactions to perform the single stage operation, not a single read transaction as claimed.

Further evidence of the above conclusion can be found in column 16, lines 19-27 of Herrera. This portion recites converting planar YUV 4:2:0 to interleaved 4:2:2 via a texture mapping engine 110. The Y, U and V pictures are broken up into squares, and each square becomes a source texture, which is mapped to the destination 4:2:2 picture. There is no indication that this operation is combined with any other operation in a single stage (requiring a single read transaction). (Compare this, for example, with the exemplary implementation shown in Fig. 5 of the presentation specification, where, in addition to YUV texture units, a texture unit 508 is assigned to supply video sub-stream data.)

In addressing a related feature in claim 4 (which has now been canceled in favor of the new feature added to claim 1), the Office Action states (in paragraph No. 9 of the Office Action):

> Herrara [sic] describes that the performing and the combination are performed in a single stage operation, and the operation is performed on the inputted DVD data stream (14, Figure 1; Col. 2, line 39-Col. 3, line 19). The inputted DVD data stream was inherently retrieved by a single call to memory.

This statement reflects a misunderstanding of what is being claimed. First, claim 1 recites two receiving operations, following by a single read transaction. If the Office Action interprets the claimed single read transaction as the reading of data from a DVD, then this leaves open the question of what the Office Action is interpreting as the initial two receiving steps recited in claim 1. In fact, the single read transaction recited in claim 1 is performed *after* the receiving operations, so it is improper for the Office Action to

interpret the single read transaction as an initial input of data from a DVD (or from any other source).

Second, according to MPEP § 2112, "In relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art." *Ex parte Levy*, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990) (emphasis in original). The fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. *In re Rijckaert*, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993). The Office Action has not demonstrated that any aggregation of operations in Herrera's stage 14 *necessarily* require only a single read transaction. Indeed, as explained above, the fact that Herrera describes that the operations are performed in series suggests that a combination of operations would require multiple read transactions, not a single read transaction.

Finally, there is no motivation to combine Salmonsen and Herrera. Salmonsen is directed to emulator functionality to transcode video signals into a specified format. Herrera is directed to a technique for delegating three specific operations to a graphics accelerator. There is no indication that Salmonsen's system can benefit from Herrera's solutions, and thus, nothing links these documents together other than Patent Office's exercise of impermissible hindsight. The Office Action asserts that Herrera discloses performing operations in a single stage, and that it would be obvious to apply this functionality to Salmonsen in order to make the process faster. However, Herrera's improvements in processing speed do not result from grouping operations together into a single stage, but rather the allocation of the three enumerated operations to a graphics accelerator. Hence, a practitioner interested in improving processing speed would not

look to Herrera's stage organization (shown in Herrera's Fig. 1) as model for modifying Salmonsen.

As stated in MPEP § 2143 to establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The Office Action fails to set forth a prima facie case of obviousness for any one of these reasons. For example, as to the third criterion, neither Salmonsen nor Herrera disclose, alone or in combination, a single stage operation, wherein the single stage operation requires only a single read transaction to perform the single stage operation Indeed, neither Salmonsen nor Herrera even address the basic motivation of combining *any video processing operations together*. Herrera's Fig. 1 does not suggest that the substages shown there are combined in the specific manner that is now recited in claim 1.

For at least the above-identified reasons, the Applicant submits that the combination of Salmonsen and Herrera does not render claim 1 obvious under 35 U.S.C. § 103. The remaining independent claims (11 and 25-27) have been amended to recite related subject matter to claim 1, and are therefore allowable for reasons similar to those provided above.

The remaining rejected claims (2-9 and 12-22) depend from the above-identified independent claims, and are allowable for at least this reason. These claims also recite additional features which are not disclosed in the either Salmonsen or Herrera, whether considered alone or combination. For example, claim 2 recites that the performing of the operation comprises de-interlacing the principal video stream. Salmonsen mentions de-

interlacing, which is not new by itself, of course. Herrera, on the other hand, actually performs processing to *interlace* video information. Thus, even if, assuming *arguendo*, one wanted to add Herrera to Salmonsen, Herrera would provide no suggestion to integrate de-interlacing with any other operation, as Herrera is not concerned with de-interlacing, but rather interlacing.

Claim 10 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Salmonsen and Herrera, and further in view of U.S. Patent No. 6,208,350 to MacInnis et al. (referred to as "MacInnis"). Applicant respectfully traverses this rejection for the following reasons.

Claim 1 depends from independent claim 1, and is therefore allowable for at least this reason. MacInnis does not remedy the above-identified deficiencies of Salmonsen and Herrera, whether these documents are considered alone or in any combination. Accordingly, the Applicant requests that the § 103 rejection based on Salmonsen, Herrera, and MacInnis be withdrawn.

Claims 23 and 24 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Salmonsen and Herrera, and further in view of U.S. Patent No. 6,466,226 to Watson et al. (referred to as "Watson"). Applicant respectfully traverses this rejection for the following reasons.

Claim 23 and 24 depend (directly or indirectly) from independent claim 11, and are therefore allowable for at least this reason. Watson does not remedy the above-identified deficiencies of Salmonsen and Herrera, whether these documents are considered alone or in any combination.

In addition, Watson does not even disclose the subject matter recited in claims 23 and 24 for which is was cited. Consider claim 24, for instance, which recites that a data processing module is configured to execute the performing and combination in a single

stage by processing video data obtained from a first and second texturing units substantially in parallel. The portion of Watson identified in the Office Action discloses (column 6, line 66 to column 7, line 7):

> A texture palette 213, also known as a color lookup table (CLUT), may be provided within GMCH 210 to identify a subset from a larger range of colors. A small number of colors in the palette 215 allows fewer bits to be used to identify the color or intensity of each pixel. The colors for the textures are identified as indices to the texture palette 215. In addition, a subpicture palette 215 may separately be provided for color alpha-blending subpicture pixels for transparency. . . .

Watson identifies the features 213 and 215 as being color lookup tables. These tables do not provide video data (associated with the principal video stream and the video sub-stream), but rather just palette information.

For at least these reasons, the Applicant requests that the § 103 rejection based on Salmonsen, Herrera, and Watson be withdrawn.

Newly Added Claims

Claims 28-30 are new claims added herein. Claim 28 is an independent claim, as reproduced below:

> 28. A method for processing video data, comprising:
>
> receiving a principal video stream from a source;
>
> receiving a video sub-stream containing supplemental information associated with the principal video stream;

in a single stage operation, performing an operation on the principal video stream and combining the principal video stream with the video sub-stream to produce processed data, wherein the single stage operation involves reading first input data associated with the received principal video stream in parallel with second input data associated with the received video sub-stream data; and

outputting the processed data.

None of the applied documents disclose at least the claimed feature which recites: "in a single stage operation, performing an operation on the principal video stream and combining the principal video stream with the video sub-stream to produce processed data, wherein the single stage operation involves reading first input data associated with the received principal video stream in parallel with second input data associated with the received video sub-stream data." For example, there is no suggestion that any of the enumerated operations shown in Fig. 1 of Herrera involve reading first input data and second input data in parallel in the manner claimed. For at least this reason, the Applicant submits that claim 28 is allowable over the applied art.

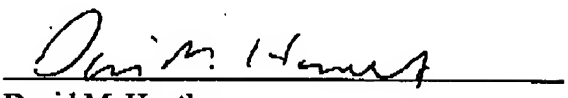
Claims 29 and 30 depend ultimately from independent claim 1, and are therefore allowable for at least this reason.

Conclusion

The arguments presented above are not exhaustive; Applicant reserves the right to present additional arguments to fortify its position. Further, Applicant reserves the right to challenge the prior art status of one or more documents cited in the Office Action.

All objections and rejections raised in the Office Action having been addressed, it is respectfully submitted that the present application is in condition for allowance and such allowance is respectfully solicited. The Examiner is urged to contact the undersigned if any issues remain unresolved by this Amendment.

Respectfully Submitted,

Dated: June 13, 2005 By: 

David M. Huntley
Reg. No. 40,309
(509) 324-9256